

# NATURAL HISTORY MISCELLANEA

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## *Crotaphytus collaris* from the Eastern Sonoran Desert: Description of a Previously Unrecognized Geographic Race

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In a recent publication, Montanucci, et al. (1975) drew attention to certain undescribed collared lizard populations in northwestern Mexico. At that time we had only recently become acquainted with living representatives of this form and were uncertain of its distribution and variation within the Sonoran Desert region. Several additional years of accumulating data has reinforced our original impression that this lizard is a distinct, easily recognizable geographic entity. As such, we believe it merits formal recognition at the subspecific level. A detailed report on this and adjacent *Crotaphytus* populations in the Sonoran region is presently in preparation. As this report may not appear for some time, however, we present here an abbreviated description to establish a name for this population. We call it :

*Crotaphytus collaris nebrius* ssp. nov.  
Sonoran Collared Lizard

**Holotype.**—Los Angeles County Museum (LACM 126617) an adult male obtained at 28° 30' 30" N-111° 02' 30" W (14 Km by road N. Rancho Cieneguita), Sonora, Mexico, El. 200 m, 3 July 1970, by Ralph W. Axtell ; originally RWA 5323.

**Paratypes.**—(See acknowledgments section for museum designations) Topotypes **14, as follows: RWA 5087-90, 5320-22, 5341, 5344, 5558, 5623, 5625, KU 152637-8.** Guaymas area 14: AMNH 75682-83, 80852, 86814; **KU 91467, 152646; LACM 52885-6, 94698; SDSNH 35917-19, 43254; UMMZ 72139.** Hermosillo area 6 : CAS-SU 12775-77 ; LACM 94691, 121433 ; **UMMZ 72138.** Southeastern Sonora 3 : UAZ 39395, 39397, 39974. Near Nacori Chico: UAZ 31482. Near Sahuaripa: UAZ 1514. SW Moctezuma: CAS-SU 12774. Huasabas area, 5 : LACM 109951, 121434-37.

**Diagnosis.**—A subspecies of *Crotaphytus collaris* characterized by 1) the complete or virtual absence of green or blue reflecting iridophores, 2) the presence of melanophores on the oral-pharyngeal floor and fauces, 3) a **gular** pattern in adult males of small, whitish dots on a ground field of pale gray laterally to darker gray or bluish gray centrally, 4) a complete or nearly complete melanic ventral gular collar, in adult males,

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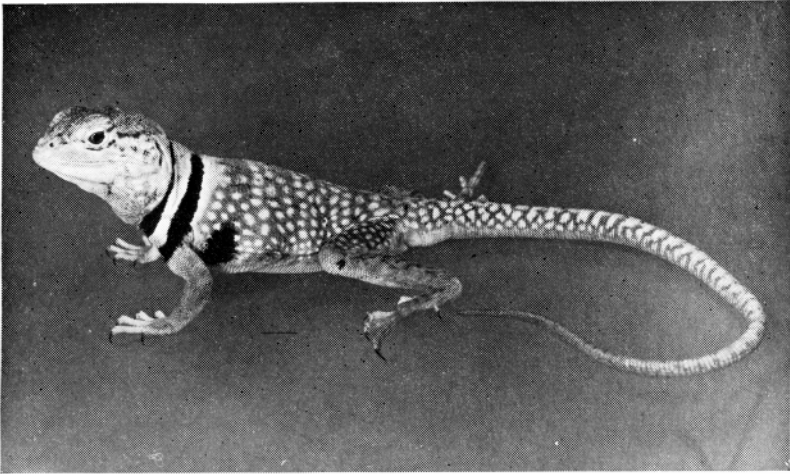


Figure 1. *Crotaphytus collaris nebris*, Ad ♂, paratopotype. RWA 5558, from 14 Km. N. Rancho Cieneguita, on Mex. 15, Sonora, Mexico. Line = 10 mm.

5) median dorsal pale spots in both sexes one and one-half to three times size of adjacent lateral spots, 6) four or five broad grayish bands on dorsal trunk in both sexes, 7) conspicuous, dark, lateral postaxillary blotches in both sexes, but better developed in adult males (other dark lateral blotches, if present, smaller and less conspicuous), 8) conspicuous melanic patches on anteroventral surfaces of both femora and on adjacent groin regions (patch covers ca. one-fourth to one-fifth of anteroventral femur, and has radius of ca. five to seven mm on adjacent lateral trunk), 9) a variable series of paired dark pigmented scales on ventral caudal extremity, 10) a laterally compressed tail (tail width into tail height, measured one forelimb length posterior to vent, in 33 adult males ranges from 1.10 to 1.54;  $\bar{x}$   $1.29 \pm 0.02$ ), 11) a "slower" migrating transferrin molecule in electrophoretic comparison with certain other forms (see Montanucci et al., 1975), and 12) a "slower" migrating heart lactate dehydrogenase pattern in electrophoretic comparison with certain other forms.

*Description of Holotype.* Dorsal crown scales smooth, slightly convex with numerous old scars (pits, grooves, striations) mainly in supra-orbital semicircle region. Area of transition between enlarged parietals and smaller temporals and postparietals also shows signs of old injuries. Rostral surface worn away, scar of rostral ca. four times wider than high with slightly convex dorsal margin; five postrostrals; six anterior and five posterior internasals with partial median symmetry; frontonasals subequal but without definite pattern; six crown scales between posterior canthals; 11 scales between median frontal (semicircle) contact and rostral; 4-4 frontals contacting medially (several scales with short or partial sutures, pits or other injuries); three median frontoparietals (anteriormost largest, more frontal-like and situated to right of median line); interparietal small, ca. twice as long as wide, with parietal lens

slightly anterior to center ; posterior edge parietal shelf about five scales posterior to interparietal ; lateral parietals largest scales on crown (ca. 1.5 X interparietal), median parietals slightly smaller, with left parietal split longitudinally into two scales; total parietal count 8-6; supraoculars almost granular with slightly enlarged scales in central area (transverse count across widest part of orbital region) 9-9 ; granular circumorbitals incomplete in frontal region, but orbital scales not easily confused with frontals; two rows of slightly enlarged scales separating granular supraoculars from superciliaries 9-10 superciliaries; 2-2 canthals with posteriormost largest ; preoculars both in contact (only slightly on right) with posterior canthal ; entire infraocular semicircle with nine enlarged scales on both sides (sixth scale on left pitted and partly replaced by granules) ; lorilabials from posterior edge of last canthal to supralabials 9-10 ; subnasals (fewest scale rows between nasal and supralabials) 2-2 ; fewest scale rows between subocular and supralabials 3-3 ; scale rows between postsuperciliary tubercle and upper jaw margin 16-17 ; supralabials (to posterior limit of enlarged infralabials) 15-15.

Mental pentagonal, widest opposite posterior infralabial suture, about as wide as long and only slightly narrower than rostral width ; postmentals large (ca. 50% of mental) and contacting medially; right postmental narrowly contacts infralabial, left does not (separated by single labiomentals) ; anteriormost chinshields (two chinshields contacting postmentals on each side) in slight contact medially and only two to three times larger than adjacent gulars and labiomentals ; chinshields rapidly decrease in size posteriorly; infralabials 15-15 ; gulars smooth, strongly convex, with slight imbrication on posterior three-fourths of chin ; symphyseal groove present but weak.

Dorsal and lateral temporal scales all smooth and moderately to strongly convex; anterior auriculars two to three times larger than posterior auriculars; auricular opening large (2.9 mm wide 5.6 mm high) but partially covered posteriorly and ventrally by a fold of nuchal skin ; several nuchal skin folds both laterally and ventrally — a small lateral fold extends from below auricular opening posterodorsally, then posteroventrally to region dorsal to dark axillary blotch. A more ventral fold extends from posterior angle of lower jaw and anterior gular fold posteriorly to shoulder, where it arches dorsally around foreleg insertion to form a deep suprahumeral pouch (a site of mite infestation in many individuals). Two transverse folds extend across gular region, an anterior fold (about 4 mm anterior to black gular collar) without a difference in scale size, and an incomplete posterior fold (within dark collar) with a conspicuous alteration in scale size near its anterior edge.

Dorsals of trunk all small, rounded, smooth, convex and nonimbricate, with minute tubercles in spaces between most scales; median dorsals posterior to midcollar area slightly larger (ca. 1.5X) than laterals ; dorsals from interparietal to anterior edge posterior collar 53 ; median ventrals smooth, flat and ca. three to four times size of adjacent laterals, smaller (slightly larger than laterals) in sternal and sacral regions, and smallest around fore and hindlimb insertions.

three times size of dorsal trunk scales ; keeling increases on posterior four-fifths of caudals, but acutely ridged keels never develop ; a slight terminal mucron present on lateral scales of distal half of tail ; dorsal and ventral caudals slightly larger than laterals; 6-6 postanals considerably to only slightly larger than adjacent caudals; scales anterior to postanals and scales surrounding hindlimb insertion minute ; a conspicuous postfemoral dermal pocket at posterodorsal junction of hindlimb and sacral trunk.

Lateral scales of forelimbs weakly imbricate with slight indication of keeling; medial scales nonimbricate, convex and smaller (half to one-fourth size) than laterals ; largest scales of forelimb on lateral and posterior surface of antibrachium (ca. twice size of middorsals) and on anterior wrist region (ca. four times size of middorsals) ; scales on upper surface of manus smooth and strongly imbricate, with apical scale organs present in metacarpal region ; palmar surface of manus strongly imbricate, with moderate keeling and three strong terminal mucrones per scale ; subdigital scales moderately imbricate with three to five mucronate keels.

Anteroventral scales of thigh (up to two and one-half times size of middorsals) and ventral scales of shank (up to three times size of middorsals) largest scales of hindlimb ; smooth, slightly imbricate scales gradually decrease in size to granules on rear of thigh (to ca. half size of middorsals), then abruptly increase in size at femoral pore line ; 19-19 dark pigmented femoral pores ; the larger, moderately imbricate but very weakly keeled shank scales become granular and subgranular dorsally, then gradually increase in size ventrally ; dorsal surface of pes faintly keeled, slightly imbricate, with apical organs on metatarsal region and larger lateral scales decreasing to smaller medially; plantar surface of pes strongly imbricate with one to three keels per scale ; subdigital scales moderately imbricate with three to five keels, each with a terminal mucron ; lamellar count for left foot (hallux first, to insertion point with nearest digit) : 10,16,20,32,13.

*Measurements.* (in mm) Snout to vent, 105.4 ; snout to posterior edge interparietal, 20.7 ; interparietal length, 2.6 ; snout to orbit (tip snout to bony contact at anteriormost edge orbit), 10.4 ; snout to ear (tip snout to ventral margin auricular depression of bony quadrate), 30.7 ; snout width (transversely between lateralmost edges nasal scales), 7.4 ; frontal width (transversely between widest points of prefrontals), 11.9 ; head width (widest point across temporal region), 25.7 ; parietal width (transversely between lateral edges postsuperciliary tubercles) 16.9 ; cranial depth (from above frontoparietal suture perpendicular to bottom mandible in closed position), 16.1 ; jaw length (tip snout to base bony coronoid with mouth closed), 17.3 ; foreleg length (axilla to digit tip exclusive of claw), 44.6 ; hindleg length (posterior insertion angle of limb to tip fourth digit), 89.4 ; length fourth toe (attachment angle with third digit to tip, exclusive of claw), 19.0 ; tail length (anterior cloacal lip to tail tip), 213 ; tail width (tail width one foreleg length posterior to cloaca), 6.8 ; and tail height (depth tail one foreleg length posterior to

**Coloration.** (in alcohol) Crown region pale to dusky tan with few small dark dots on frontonasal region ; temporal area dusky tan with traces of longitudinally elongate darker marks ; sides of head pale tan with obscure to distinct dark lines radiating anteriorly, ventrally and posteriorly from eye ; both dark collars interrupted middorsally ; anterior collar ca. five scales wide, posterior collar six scales wide (counted 4 mm right of vertebral line) ; paired pale gray nuchal spots elongate, extending from occipital region to between anterior dark collar ; traces of thin, creamish transverse band preceding anterior dark collar, similar pale bands between collars and posterior to second collar; ground color between and around collars dull grayish to grayish white ; four dusky crossbands (ca. 13 dorsal scales wide) on dorsal trunk, all separated by thin yellowish tan interbands ; numerous whitish spots (from five to seven scales across) tend to obscure banding dorsally on trunk and base of tail ; large, dark axillary blotch at ventral margin of first broad crossband, remaining broad crossbands terminate below lateral fold but lack melanistic pigment ; whitish spotting continues on dorsolateral surfaces of tail, but degenerates distally to irregular light and dark crossbands ; crest of tail dusky white proximally, becoming grayish near central section and brownish gray on distal third ; tail uniform dusky beige gray ventrally except postanal area which is dusky cream. Gular area pale gray anteriorly to dark or bluish gray posteriorly, spotted and flecked with white ( obscure gray chevrons on anterior gular region) ; anterior dark nuchal collar complete ventrally with dusky grayish crossband immediately posterior to collar ; posterior dark collar extends across forelimb insertion to terminate on anteroventral surface of arm ; remainder of belly gray; forelimb dull grayish anterolaterally, mottled with paler scales ventromedially ; ground color of hindlimbs beige gray dorsally with many small ( ca. 1-2 mm) whitish dots on thigh and shank; ground color reverses to dark dots on pale gray on distal shank ; ventral surface of hindlimbs predominately pale gray with irregular whitish swaths (tending toward crossbands on shanks) on most surfaces ; dark groin patch covers ca. one-fourth of anteroventral surface of thigh (almost to femoral pores) ; ventral ankle region and plantar surface of pes pale creamish gray.

**Comparisons.** *C. c. nebrius* is allopatrically associated with two distantly related *Crotaphytus* species (see Montanucci et al., 1975) on the northwestern and western peripheries of its range. From *C. insularis bicinctores*, on its northwestern periphery, it can be distinguished by : 1) presence of oral-pharyngeal melanin (none in *C. i. bicinctores*), 2) extension of the dark, posterior nuchal collar over the proximal brachium (absent in *C. i. bicinctores*), 3) presence of a pair of dusky paravertebral spots between median dorsal edges of the anterior nuchal collar (absent in *C. i. bicinctores*), 4) gular ground coloration in adult males pale to peach-gray peripherally to darker gray or occasionally bluish-gray centrally (white ground color peripherally in *C. i. bicinctores*, changing rapidly from gray-blue to black centrally), 5) gular pattern in adult males (especially centrally) a uniform grayish field broken by numerous small whitish dots (adult male *C. i. bicinctores* have a gular pattern of large rounded spots of various shades from gray to sky blue). 6) a

"slower" migrating heart lactate dehydrogenase pattern ("faster" migrating in *C. i. bicinctores*). The comparisons above represent essentially mutually exclusive features. In addition, there are numerous other characters (of color pattern, scalation and measurement) which represent significant differences between the compared populations, but which are not generally exclusive to one or the other form. A similar statement would be appropriate for the remaining comparisons below. From *C. dickersonae*, on the western periphery of its range, *C. c. nebrius* can be distinguished by: 1) complete or virtual absence in adult males of green or blue reflecting iridophores (adult male *C. dickersonae* are vivid blue to greenish blue), 2) a pair of dark spots between median dorsal edges of anterior nuchal collar (absent in *C. dickersonae*), 3) gular pattern in most adult males a uniform grayish field broken with numerous small whitish dots (adult male gular pattern in *C. dickersonae* of large rounded spots in various shades of gray, blue-gray or black), 4) a distinct, dark postaxillary patch (opposite first dorsal broad band) on or below the lateral dermal fold (absent in *C. dickersonae*), 5) whitish median dorsal spots usually one and one-half to three times size of adjacent lateral spots (pale dorsal dots in *C. dickersonae* about same size as lateral dots), and 6) tail width into tail height (measured one foreleg length posterior to cloaca' opening) in 33 adult males ranges from 1.10 to 1.54;

$1.29 \pm 0.02$  (comparable ranges in 18 adult male *C. dickersonae* are 1.53 to 2.20 ;  $x = 1.87 \pm 0.04$ ). There is considerably more overlap in the female ratios, however:

*C. c. nebrius* closely approaches *C. c. baileyi* populations near Tucson, Arizona, south of Nogales, Sonora, and in the Oputo region of north-eastern Sonora. In all three areas there is some evidence of intergradation between the two races, but this is so limited that allocation of individual specimens is accomplished with little difficulty (one or more of the diagnostic characters may break down, but not all). We have found no areas where populations of both forms come into direct physical contact. *C. c. nebrius* differs from *C. c. baileyi* by: 1) lacking obvious concentrations of green or bluish-green reflecting iridophores on any part of the body (present in obvious concentration in all adult male *C. c. baileyi*, and many adult females), 2) possessing, in adult males, a complete (84%,  $N = 69$ ) or nearly complete (remaining 16%) dark gular collar (dark collar terminates anterior to foreleg insertion in all 74 adult male *C. c. baileyi* examined), 3) possessing, in adult males, a gular pattern of whitish dots on a generally uniform ground of pale grayish white peripherally to darker gray or bluish-gray centrally (gular ground in *C. c. baileyi* changes from white or yellow laterally to dark blue-green or gray-green centrally), 4) having two rows of dark pigmented obtuse keels (97%,  $N = 100$ ; exceptions are probably intergrades) on the ventral caudal extremity (similar dark keeled scales occur in only seven (5%) of 138 *C. e. baileyi* examined, and several of these are from presumed intergradient populations), 5) adult males possessing a dorsal trunk pattern of whitish dots from one and one-half to three times larger than dots on adjacent lateral flanks (dots in adult male *C. c. baileyi* are equal to or only slightly larger than adjacent lateral dots), and 6) a

"slower" migrating transferrin molecule, compared to a "faster" migrating transferrin in *C. c. baileyi*.

Although we have not made extensive observations on, or comparisons with *C. c. fuscus* Ingram and Tanner (because it is geographically separated from *C. c. nebrius* by *C. c. baileyi* populations), we do not, as did Ingram and Tanner (1971) and Smith and Tanner (1974), consider *C. c. nebrius* synonymous with or even closely related to *C. c. fuscus*. *C. c. nebrius* differs from *C. c. fuscus* by the following (based on examination of 15 *C. c. fusel*s): 1) a complete or nearly complete dark gular collar (no dark gular collar in *C. c. fuscus*), 2) central gular area of adult males a generally uniform grayish field broken by numerous small whitish dots (pattern in adult male *C. c. fuscus* of large rounded grayish spots on a whitish ground peripherally to a dusky greenish gray ground centrally), 3) whitish dorsal trunk spots one and one-half to three times size of adjacent lateral spots (in *C. c. fuscus* pale dorsal spots about same size as lateral spots), 4) distinct, broad, dusky crossbands alternating with narrow, pale crossbands on the dorsal trunk (dorsal trunk crossbanding absent or indistinct in *C. c. fuscus*), 5) a large, dark postaxillary patch below anteriormost dorsal broad band (lateral dark postaxillary patch usually absent, but if present no larger or more distinct than more posterior patches), and 6) in adult males, dark . inguinal blotches on proximal thighs and lateroventral trunk (no such blotches occur in adult male *C. c. fuscus*).

It is obvious from the above comparisons that several of the characters used occur in more than one of the species or subspecies considered. Therefore, it is their sequence of appearance in the several taxa that renders them useful diagnostically.

**Distribution.** *C. c. nebrius* is a roughland denizen inhabiting lowland (up to ca. 1070 m) desert and semidesert mountain ranges from southwestern Arizona southward through much of central Sonora, Mexico, to about the latitude (28°N) of Guaymas. More specifically the range extends from the vicinity of Yuma, Arizona (Gila Mountains) south-eastward to the Sierra del Alamo (west of Caborca, Sonora) and southward toward Guaymas. Several records are known eastward from Guaymas to about 109°W longitude. Populations presumably occur at lower elevations along many of the streams draining central and east-central Sonora (Rio Yaqui and Rio Sonora drainages), but none of these approach the Sonora-Arizona border (an upland area populated by *C. c. baileyi* all the way westward to the southern Baboquivari Mountains). Populations inhabit many of the desert ranges in south-central Arizona, from the vicinity of Tucson (Tucson Mountains) northwestward to near Phoenix (Estrella Mountains) and then westward, south of the Gila River, to near Yuma.

**Etymology.** The name *nebrius* comes from the Greek word *nebrias* meaning spotted like a fawn. This is in allusion to the distinctive large white dorsal spotting in this form.

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